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### EXPLORATION – 3-MODES OF OPERATION

Through the NOAA Science Advisory Board’s Ocean Exploration Advisory Working Group (OEAWG), the NOAA Office of Ocean Exploration and Research (OER) received input on different modes of operation that could be implemented during the course of a field season. Since the last OEAWG workshop, OER staff and partners at the Institute for Exploration (IFE) and the University of Rhode Island (URI) have worked to define these models with the objective of testing and evaluating them during “Field Trials” and initial expeditions. These are described below.

***Site Characterization.*** Site Characterization is defined as working at a specific target location where there is some background information to work from and the discovery potential is high. Models include the joint OER/IFE cruises that have been conducted over the past several years, as well as OER expeditions in the northern Gulf of Mexico, which have focused on characterizing predetermined targets. A site characterization field trial cruise will utilize most of the ship and ROV capabilities, and dedicated broad-band satellite time for telepresence operations will be scheduled. The objective will be to map and explore the seafloor and bottom features, as well as to characterize the water column above the target location. The objectives include developing standard products to ensure a consistent portfolio of data and information, enabling OER and other programs and institutions to make decisions concerning follow-up exploration, research, and even management activities for the target location.

***Water Column Exploration.*** The science community has expressed interest in testing the ability of the ship and its systems to explore and investigate the water column. Although it is not envisioned that the ship would ever execute an expedition focused solely on the water column, there is value in scheduling such dedicated field trial cruises during the first year of operations in order to: (1) improve our ability to characterize the water column during site characterization; (2) improve our ability to search for anomalies during reconnaissance expeditions; and (3) determine how to maximize the use of the ship and systems during transits through poorly known areas where the water depth exceeds the limits of the multibeam and ROV. Honing our ability in this area should also provide information that would be useful for investigating other non-vessel technologies more appropriate for water column exploration. Ewing stations – defined as stopping once each 24-hour day to collect water column data (numeric data, visual data, and limited samples) – would be a key component of such a cruise. Dedicated broad-band satellite time for telepresence operations would not be required for this field trial cruise. Objectives include developing standard products that complement information collected through other manned and unmanned assets such as the Argo profiling CTD floats.

***“Sticks-and-Boxes” Reconnaissance.*** Reconnaissance is defined as transiting through unknown and poorly known waters within the depth range of the multibeam and ROV with the express purpose of making a discovery and initiating Site Characterization operations as described above. It is envisioned that this will ultimately be the primary operating mode for the ship. A working model is the OE supported Ring-of-Fire expeditions that searched for anomalous chemical signatures to make decisions about where to deploy assets such as HOVs and ROVs for detailed exploration. Ewing stations as described above would be part of this operating mode. Such a field trial cruise will test all of the capabilities of the ship, and will require dedicated broad-band satellite time for telepresence operations. Standard products would include elements of both Site Characterization and Water Column Exploration. The length of time spent on a “discovered” target would be based both on an initial assessment of the detailed data collected, as well as the preplanned time-frame for the cruise.